CLAIMS

What is claimed is:

1. Method for selecting and providing polymers for use in outgassing-sensitive environments, the method comprising:

selecting a suitable addition polymerizing material;

determining a quantity of said material for a single application;

mixing a quantity of said selected material in a batch of at least four times the quantity for the single application, said mixing resulting in combining component parts of said addition polymerizing material for polymerization, whereby said mixing is provided at stoichiometric proportions within 2% by weight;

subdividing the batch into single application quantities;

placing a plurality of the application quantities in a chilled environment such that polymerization is retarded sufficiently for anticipated future use of the plurality of said application quantities as pre-mixed frozen (PMF) material; and

providing individual ones of the application quantities for use in the outgassing-sensitive environments, thereby permitting cold storage of unused application quantities retained for future use while providing said individual ones of the application quantities for use as desired.

2. Method as described in claim 1, wherein the addition polymerizing material includes two-part epoxy.

3. Method as described in claim 1, wherein the addition polymerizing material includes epoxy which utilizes an amine adduct curing agent which is a product of poly-functional amines and mono-functional epoxy intermediate materials.

4. Method as described in claim 1, wherein the addition polymerizing material includes a silicone polymer which achieves curing by vinyl polymerization.

5. Method as described in claim 1, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day;

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM tests performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment; and

using date from said TML and CVCM tests to verify the polymers are suitable for use in the given configuration in an outgassing-sensitive environment.

6. Method as described in claim 1, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr; and

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM testing performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment.

7. Method as described in claim 1, further comprising:

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applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C; and

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM testing performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment.

8. Method as described in claim 1, further comprising outgassing the assembled components to deplete trapped and dissolved gases, including:

nitrogen, oxygen and water,

solvents, if any, used during cleaning processes,

low molecular weight hydrocarbons and amines from the component parts of said addition polymerizing material, and

residual and unreacted material from said component parts of said addition polymerizing material.

9. Method as described in claim 1, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C, said outgassing depleting trapped and dissolved gases, including nitrogen, oxygen and water, solvents, if any, used during cleaning processes, low molecular weight hydrocarbons and amines from the component parts of said addition polymerizing material, and residual and unreacted

material from said component parts of said addition polymerizing material.

10. Method for assembling optics, the method comprising:

selecting an addition polymerizing polymer suitable for use in an outgassing-sensitive environment;

determining a quantity of said material for a single application;

mixing a quantity of said selected material in a batch of at least four times the quantity for the single application, said mixing resulting in combining component parts of said addition polymerizing material for polymerization, whereby said mixing is provided at stoichiometric proportions within 2% by weight;

subdividing the batch into single application quantities;

placing a plurality of the application quantities in a chilled environment such that polymerization is retarded sufficiently for anticipated future use of the plurality of said application quantities as pre-mixed frozen (PMF) material;

providing individual ones of the application quantities for use in the outgassing-sensitive environments, thereby permitting cold storage of unused application quantities retained for future use while providing said individual ones of the application quantities for use as desired; and

assembling at least one component of the optics by bonding with said PMF material.

11. Method as described in claim 10, wherein the addition polymerizing material includes epoxy which utilizes an amine adduct curing agent which is a product of poly-functional amines and mono-functional epoxy intermediate materials.

12. Method as described in claim 10, wherein the addition polymerizing material includes a silicone polymer which achieves curing by vinyl polymerization.

13. Method as described in claim 10, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day;

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM tests performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment; and

using date from said TML and CVCM tests to verify the polymers are suitable for use in the given configuration in an outgassing-sensitive environment.

14. Method as described in claim 10, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr; and

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM testing performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment.

15. Method as described in claim 10, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C; and

performing total material loss (TML) and collected volatile condensable materials (CVCM) tests subsequent to said outgassing, said TML and CVCM testing performed at least once for a given combination of polymer and configuration in the outgassing-sensitive environment.

16. Method as described in claim 10, further comprising outgassing the assembled components to deplete trapped and dissolved gases, including:

nitrogen, oxygen and water,

solvents, if any, used during cleaning processes,

low molecular weight hydrocarbons and amines from the component parts of said addition polymerizing material, and

residual and unreacted material from said component parts of said addition polymerizing material.

17. Method as described in claim 10, further comprising:

applying one of said individual quantities in assembling components for use in an outgassing-sensitive environment;

outgassing the assembled components for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C, said outgassing depleting trapped and dissolved gases, including nitrogen, oxygen and water, solvents, if any, used during cleaning processes, low molecular weight hydrocarbons and amines from the component parts of said addition polymerizing material, and residual and unreacted

material from said component parts of said addition polymerizing material.

18. A polymer for use in outgassing-sensitive environments, comprising:

suitable addition polymerizing material selected to provide low total material loss (TML) and collected volatile condensable materials (CVCM) values, said addition polymerizing material mixed by determining a quantity of said material for a single application, mixing a quantity of said selected material at stoichiometric proportions within 2% by weight in a batch of at least four times the quantity for the single application, said mixing resulting in combining component parts of said addition polymerizing material for polymerization, subdividing the batch into single application quantities, and placing a plurality of the application quantities in a chilled environment such that polymerization is retarded sufficiently for anticipated future use of the plurality of said application quantities as pre-mixed frozen (PMF) material; and

the mixed polymerizing material provided in individual ones of the application quantities for use in the outgassing-sensitive environments, thereby permitting cold storage of unused application quantities retained for future use while providing said individual ones of the application quantities for use as desired.

19. A polymer as described in claim 18, wherein the addition polymerizing material includes epoxy which utilizes an amine adduct curing agent which is a product of poly-functional amines and mono-functional epoxy intermediate materials.

20. A polymer as described in claim 18, wherein the addition polymerizing material includes a silicone polymer which achieves curing by vinyl polymerization.

21. A polymer as described in claim 18, wherein the polymer is outgassed by outgassing by placing an assembly using the polymer for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C.

22. A polymer as described in claim 18, wherein the polymer is outgassed by outgassing by placing an assembly using the polymer for at least one day in a high vacuum environment of pressure lower than 10^{-6} torr and at least 30°C to deplete trapped and dissolved gases, including:

nitrogen, oxygen and water,

solvents, if any, used during cleaning processes,

low molecular weight hydrocarbons and amines from the component parts of said addition polymerizing material, and

residual and unreacted material from said component parts of said addition polymerizing material.